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NURSING AND ENVIRONMENTAL STUDIES

Environmental awareness training and nursing students' attitudes: A quasi-experimental study

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Abstract
Environmental issues in nursing may not seem urgent since nursing primarily involves interacting with patients in hospitals or communities. For this perspective, studying nursing students' attitudes towards environmental issues is crucial. Unfortunately, research in this area remains scarce in the literature. Therefore, this study aimed to improve nursing students' attitudes toward environmental issues through a specific training program. The study employed a quasi-experimental pretest–posttest control group design that involving 164 students from the Faculty of Nursing at Aydın Adnan Menderes University, Türkiye. Of these, 79 students were assigned to the experimental group and 85 to the control group. Data were collected between November 2022 and July 2023. Intervention group received a 4-week training program related to environmental issues. In contrast, the control group received no usual or standard program. Prior to commencing the study, ethical clearance and informed consent were obtained. Data analysis was performed using SPSS; appropriate tests were selected based on normality results, and statistical significance was set at $p<0.05$. The study highlighted that the participants in the intervention group had significantly higher scores regarding environmental issues compared to the control group. These high scores were observed across all sub-dimensions, specifically in Receiving, Reacting, Valuation, Organizing, Personalizing, and Environmental Problems Attitude. The study's findings suggest that universities and governments should prioritize environmental education and literacy programs. This is essential for enhancing nursing care, particularly in community settings.

Keywords: Attitude, environmental issues, health education, nursing care, nursing students

Introduction

Today, the disruption of the natural environmental cycle and global climate change have become major issues on the global agenda (Woodward, 2019). These crises are evidenced by the melting of polar ice caps, the thinning of the ozone layer, the destruction of tropical forests, the decline in biological diversity, water pollution, the depletion of natural resources, and the widespread radioactive and chemical pollution from nuclear power plants and agricultural activities (Ofremu et al., 2025; United Nations Environment Programme, Environmental Effects Assessment Panel, 2017; Chu & Karr, 2013). Factors such as increasing industrialization, rapidly advancing technology, and unconscious societal attitudes and behaviors have collectively contributed to a surge in environmental problems (Elmor et al., 2024; Oláh et al., 2020; Ahmed et al., 2022). These negative impacts have become especially noticeable across all countries worldwide since the second half of the twentieth century. As countries are forced to take measures to deal with environmental problems, environmental protection, information, and awareness training play a significant role (Wu et al., 2024). These efforts are key to increasing environmental awareness and sensitivity, informing society about critical issues, and motivating individuals to take necessary precautions (Boermans et al., 2024).

To effectively address current environmental problems, education must be utilized to impart necessary knowledge, shape positive attitudes, and improve pro-environmental behaviors across the cognitive, affective, and psychomotor domains. Environmental-focused education can provide effective solutions to environmental problems and increase environmental awareness and consciousness (Wetering et al., 2022). Environmental education seeks to raise awareness about consumption and environmental protection along with promote a society that values sustainability

(Agrawal et al., 2023). With this in mind, it promotes a culture of responsibility, conservation, and sensitivity towards the environment for future generations (Kim & Lee, 2023). Humanity is forced to cope with numerous environmental problems that directly or indirectly affect its health (Sundas et al., 2024). Deterioration of environmental health can lead to acute, chronic, infectious diseases, and even death (Shetty et al., 2023). According to World Health Organization (WHO) data, approximately 23% of premature deaths are related to environmental factors, and air pollution is reported to cause approximately seven million deaths each year (World Health Organization, 2024). Universities as providers of higher education bear the important responsibility of raising future-conscious and responsible generations through the promotion of environmental and social awareness (Filho, 2011; Buerkle et al., 2023). This role is amplified within nursing faculties since given their critical mission to train the nurses who will directly influence public health and sustainability. Nurses have the unique potential to reach all segments of society and individuals of every age that making them powerful agents of change. Furthermore, the environment is a fundamental area of nursing practice. Therefore, preparing nursing students for competent practice in both social and global areas represents one of the most effective and feasible ways to advance societal development in this regard. Florence Nightingale was the first to emphasize the importance of the environment in nursing that making a significant contribution to the profession's development (Riegel et al., 2021). Nightingale viewed the environment as a fundamental element in professional nursing practice and drew attention to the decisive role of nurses in creating a healthy environment (Kolagari, 2023).

In studies examining nursing students' environmental risk and attitudes, studies found high levels of attitudes (Bakan et al., 2020; Karavin et al., 2023). Also, other studies showed that students exhibited ambivalent attitudes towards the environment (Bodur & Taşocak, 2013; Kapan & Gürel, 2022). Furthermore, a study by found nursing students' environmental risk perceptions to be high and their attitudes to be moderate (Dereli & Yıldırım, 2024). A positive, low-level correlation was found between students' environmental risk perceptions and their attitudes. The seriousness of environmental problems and the extent to which they threaten the health of individuals and communities necessitates a stronger response from the healthcare sector. Therefore, all healthcare professionals must increase their environmental sensitivity, raise global awareness of these issues, and take the necessary measures. The inclusion of specific topics in nursing education is essential for developing key professional competencies. These competencies include nurses' awareness of the environment's impact on human health and healthcare services, their adoption of sustainable healthcare principles, and their acquisition of an environmentally-centered ethical understanding. This crucial need for environmental health education was officially emphasized in 1995 with the publication of Environmental Health Competencies in Nursing Education by the Institute of Medicine (Kirk, 2002; Karahan-Okuroğlu 2012). Drawing from previous research, environmental education has a major impact in helping nursing students and the communities they serve develop positive attitudes toward the environment. Consequently, this study specifically aimed to improve the environmental attitudes of nursing students through targeted training designed for that purpose.

The study is of critical importance in Turkey because the nation faces escalating environmental challenges which directly threaten public health. Nurses are essential to both mitigating these threats and promoting environmental health principles at the community level, yet studies often show that Turkish nursing students possess only a moderate level of environmental literacy and insufficient knowledge of global issues like the Sustainable Development Goals (SDGs). With proving that educational training can improve the environmental attitudes of future nurses, this research provides the necessary evidence-based justification for integrating comprehensive environmental health education into the national nursing curriculum. The finding empowers thousands of graduates to become effective advocates for both human and planetary health across Turkish society. Furthermore, this study can impact nursing curricula in Turkey by highlighting the importance of integrating environmental education into nursing programs. It can inform curriculum development, encourage educators to incorporate sustainability and environmental health content. This, in turn, can enhance nursing practice, promote sustainable healthcare, and contribute to a healthier environment. As a result, Turkish nursing curricula may prioritize environmental awareness and sustainability that shaping the next generation of nurses to be conscious and responsible healthcare professionals in environmental issues.

Method

The study employed a quasi-experimental design utilizing a pre-test, post-test, and control group structure. The design choice was necessitated by the logistical constraints of using student volunteers and collecting data at their convenience, which precluded the possibility of randomization. The study was conducted at Aydın Adnan Menderes University (ADU), Faculty of Nursing. Data were collected between November 2022 and July 2023. A total of 1114 students of Faculty of Nursing at ADU, Türkiye in 2022 was enrolled as population in the study. However, not all became participants in the study. The researcher applied certain criteria to select participants for this study. The inclusion criteria

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were being a 1st, 2nd, 3rd, or 4th-year student at the ADÜ Faculty of Nursing, volunteering for the research, and committing to fully participate in all educational sessions of the study process. Conversely, exclusion criteria included incomplete data form submission, failure to attend any training session, prior participation in a relevant environmental educational study, voluntary withdrawal, or having a health disability (such as vision or hearing impairment) that would impede comprehension of the educational content. The sample size was determined using G*Power, with an effect size of 0.80 (large), an alpha value of 0.05, and a power of 0.90, resulting in a minimum sample size of 140. Considering potential data loss, the sample was overrepresented, and the study was completed with a total of 164 students: 79 in the experimental group and 85 in the control group. A stratified sampling method (based on the class variable) was used to assign students to the experimental and control groups. The further detail of the study was presented in the figure **(Figure1)**.

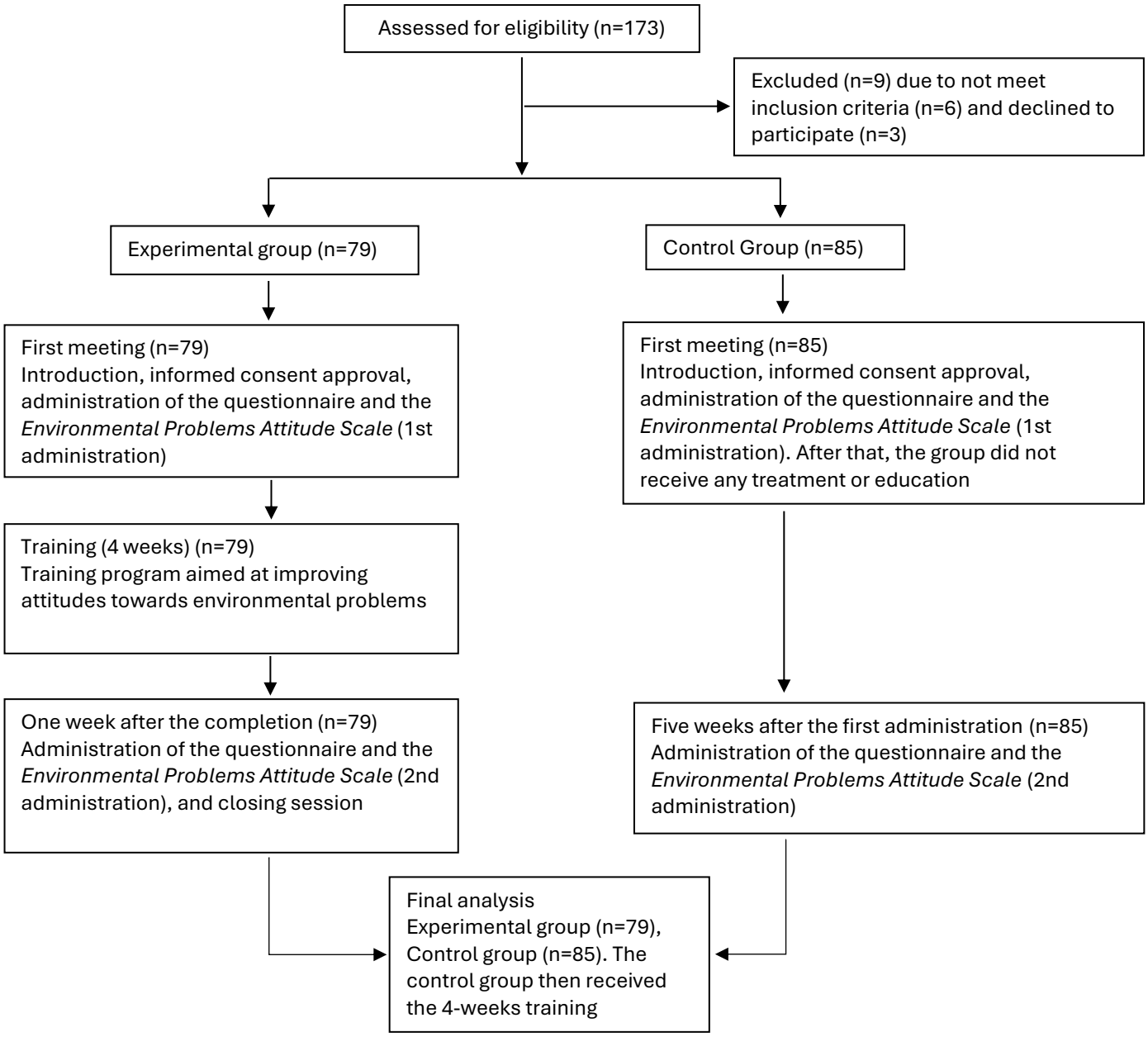

Figure 1. Study process.

Data collection in this study utilized several instruments as follows a demographic questionnaire and the Environmental Problems Attitude Scale. The demographic questionnaire consists of age, sex, longest place from

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residence, class, economic status, current place of residence, who do you live with, mother's educational status, father's educational status, family type, and graduated from high school. Other tool is survey form which included 64 items evaluating nursing students' characteristics and environmental awareness (Güven, 2013; Özgel et al, 2018; Kayaer & Çiftçi, 2022). The last tool is Environmental Problems Attitude Scale to determine the level of attitudes towards environmental issues (Güven, 2013). The scale consists of 45 items with a 3-point Likert scale optioning and included five factors such as Receiving, Reacting, Valuation, Organizing, and Personalizing. The Kaiser-Meyer-Olkin (KMO) value of 0.77 indicated the relationships between the items are strong enough to yield reliable and distinct factors. The Cronbach's alpha value of the scale was found to be 0.88. The Cronbach's alpha values of the factors are 0.93, 0.90, 0.68, 0.75, and 0.59, respectively. Additionally, items 5, 6, 7, 13, 15, 16, 26, 27, 29, 31, 34, 41, 43, and 44 are reverse-scored. Each correct answer on the scale is worth 2 points, while the "I don't know" response is worth 1 point. No points are awarded for incorrect answers. The highest possible score on the scale is 90, and the lowest is 0. A high score indicates a strong attitude toward environmental issues (Güven, 2013). The scale is completed using students' self-reports. It has been used in many academic studies to determine or develop university students' attitudes towards environmental problems (Çokçalışkan & Çelik, 2017; Bakan et al., 2020; Yıldız et al., 2021). The scale does not have a specific threshold for categorizing attitude levels. High scores indicate a high attitude towards environmental problems.

The researchers provided treatment to two groups with the following details. Beforehand, all participants provided their informed consent by signing the relevant documents. In the experimental group, the demographic questionnaire and the Environmental Problems Attitude Scale were administered. After the first implementation, a 4-week training program was conducted on days and times convenient for the students. The program covered the following topics: "Important concepts and approaches in protecting the environment and nature," "The impact of the environment on human health and nursing," "Attitudes and behaviors that protect the environment," and "A cleaner environment for future generations." Each training session lasted an average of 40 minutes. Training sessions were completed in a total of 4 weeks, one session per week. Make-up training sessions were held during the week for students who were unable to attend at a time and date convenient for them. The second implementation, the Environmental Problems Attitude Scale assessment was used at one week after the completion of the training sessions. The control group followed a parallel schedule that receiving the pre-training questionnaire and the Environmental Problems Attitude Scale. The second administration of the tool occurred five weeks later (concurrently with the experimental group). The control group received no intervention beyond completing the questionnaire which continued until the experimental group's data collection was finished. To address ethical considerations, the control group students were provided with the same environmental attitude training after the study's data collection phase was completed at times convenient for their participation. Data were evaluated using SPSS Version 21, employing basic statistical tests (arithmetic mean, standard deviation, median, and IQR), along with the Chi-Square, Wilcoxon, and Mann-Whitney U tests. Ethical committee approval and institutional permission were secured, and permission to use the relevant scale was obtained. Furthermore, all participating students provided written consent. This research was generously supported by TÜBİTAK under the scope of its 2209-A University Students Research Projects Support Program (Number: 31906847/050.04.04.-08).

Results

The demographic characteristics were analyzed separately for both the experimental and control groups. In the experimental group, 69.6% of students were female, and their average age was 21.15±1.51. Regarding key background factors, 44.3% were in their fourth year of study, 50.6% resided in a metropolitan area, and 77.2% graduated from Anatolian high schools. Financially, 59.5% reported their income was equal to their expenses. Furthermore, the majority came from nuclear families (72.2%), with parental education levels clustering at elementary school or less for mothers (55.7%) and fathers (45.6%). Similarly, the control group demonstrated a highly comparable profile, with 68.2% female students and an average age of 20.94±1.65. The group composition showed 43.5% lived in a metropolitan area and 75.3% graduated from Anatolian high schools. A slightly higher percentage (64.7%) reported income equal to expenses, and 81.2% came from nuclear families. Parental education levels were also similar, with 50.8% of mothers and 42.4% of fathers having an elementary school education or less. These analogous demographics suggest the groups were relatively balanced on key potential confounding variables **(Table 1)**.

Analysis of the students' initial environmental characteristics revealed a clear gap between awareness and active engagement in both groups. A striking majority in both the experimental group (88.6%) and the control group (89.4%) affirmed that environmental health education was important. This sentiment aligns with a high degree of concern for the future, as 83.5% of the experimental group and an even higher 91.8% of the control group expressed concern about the environment being left to future generations. Despite this, a large proportion in both the experimental (87.3%) and control

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(84.7%) groups reported that they had not previously received formal education on environmental health. Consistent with the lack of formal training, reported rates of active environmental participation were low across the board. Over three-quarters of the experimental group (75.9%) and 82.4% of the control group had not participated in any environmental activities. Furthermore, membership in environmental civil society organizations was negligible, standing at 94.9% (experimental) and 95.3% (control) reporting no such membership. This lack of active engagement extended to daily behavior, particularly in purchasing habits. A significant majority in the experimental group (70.9%) and 61.2% of the control group reported that they did not check whether products were environmentally friendly when making a purchase. These baseline findings suggest that while students intellectually value environmental health, they lack the formal knowledge and integrated behavioral practices to translate that concern into action **(Table 2)**.

Students in the experimental group showed post-training changes in Receiving (-2.487; p=0.013), Reacting (-3.074; p=0.002), Valuation (4.820; p=0.000), Organizing (2.227; p=0.026), Personalizing (-3.926; p=0.000), and Total Scale (-3.288; p=0.001) scores were found to be higher than before the training. When examining Cochran's r values in the experimental group, small effects were observed in the dimensions of Receiving (r=0.194), Reacting (r=0.240), Organizing (r=0.174), and Total Scale (r=0.257) dimensions showed a small effect, while Valuation (r=0.376) and Personalizing (r=0.307) dimensions showed a moderate effect. Thus, the effect sizes reveal that the training is effective and powerful in practice in terms of Valuation and Personalizing, but limited in practice in terms of Receiving, Reacting, Organizing, and Total Scale. When comparing the post-training scores of students in the control group with their pre-training scores, Organizing (3.002; p=0.003) scores were found to be low, while Personalizing (-2.991; p=0.003) scores were found to be high. The students in the experimental group had higher scores than the students in the control group in Receiving (2765.500; p=0.046), Reacting (2524.000; p=0.006), and Valuation (2056.500; p=0.000) after the training. Considering the effect sizes, the effect was found to be small in the Receiving (r=0.156) and Reacting (r=0.215) dimensions and moderate in the Valuation (r=0.304) dimension. These results show that the training created significant differences in some areas and had a particularly effect in the valuation dimension **(Table 3)**.

Discussion

In this study, the Receiving, Reacting, Valuation, Organizing, Personalizing, and Total Scale scores in the experimental group increased after the training. Then at the same time, the Receiving, Reacting, and Valuation scores of the students in the experimental group were found to be higher than those in the control group. The experimental group showed significant post-training increases across all measured sub-scales—Receiving, Reacting, Valuation, Organizing, and Personalizing—as well as in the Total Scale score. This widespread improvement suggests the training was successful in generating initial awareness and responsiveness (Receiving and Reacting) and improving the more complex, higher-order skills of internalizing, integrating, and developing a coherent set of values (Organizing and Personalizing). Furthermore, the direct comparison with the control group confirmed the program's specific impact, as the experimental group scored significantly higher in the foundational categories of Receiving, Reacting, and Valuation. In the nurse's role, this means nurses can assess and identify environmental issues, respond immediately, and value the importance of their actions (Larsson & Butterfield, 2002). The study highlights the significance of environmental-focused nursing education and interventions for professional growth, critical thinking improvement, and a commitment building as a part of community care (Shaban et al., 2024).

The finding also demonstrates the efficacy of the training program in developing students' affective domain skills which are important for professional roles. A study investigating nursing students' connection to environmental sustainability demonstrated that these students generally possessed strong environmental awareness and understanding (Dönmez & Yardımcı, 2024). Furthermore, that research indicated that nursing students consistently exhibited moderate to good sustainable consumption habits in their daily lives. This combination of high awareness and reasonably responsible behavior suggests that nursing education may be effectively instilling the values necessary for future healthcare professionals to address the profound links between environmental health, public health, and sustainable clinical practice (Boakye et al., 2024; Lemery et al., 2024). To deepen their understanding, incorporating the importance of sustainable practices for environmental conservation and human well-being into nursing curricula is essential (Roberge et al., 2024). This would promote a better grasp of environmental issues and promote eco-friendly behaviors among future nursing professionals. Environmental problems represent one of the most significant health issues of the current century (Sherman et al., 2023; Gkouliaveras et al., 2025). For instance, global warming, climate change, melting glaciers, increased industrial activity, technological advances, and changes in vegetation cover. To mitigate the conditions, it is important to develop strong awareness and protective attitudes towards the environment that starting at the individual level and expanding throughout society (Zhao et al., 2022).

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Table 1. Socio-demographic characteristics of participants.

Variables	Experimental group (n=79)		Control group (n=85)		X^2	*p*
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
Age	18-24	21.15±1.51	18-26	20.94±1.65		
Sex						
Female	55	69.6	58	68.2	0.037*	0.848
Male	24	30.4	27	31.8		
Longest residence						
Metropolitan city	40	50.6	37	43.5	6.873**	0.076
District	29	36.7	28	32.9		
Town	4	5.1	2	2.4		
Village	6	7.6	18	21.2		
Class						
First	19	24.1	22	25.9	18.465*	0.000
Second	11	13.9	23	27.1		
Third	14	17.7	27	31.8		
Fourth	35	44.3	13	15.3		
Income						
Exceeds expenses	22	27.8	11	12.9	6.877*	0.032
equals expenses	47	59.5	55	64.7		
Less than expenses	10	12.7	19	22.4		
Residence						
Country	46	58.2	57	67.1	1.445**	0.486
Home	30	38	26	30.6		
Apartment	3	3.8	2	2.4		
Who do you live with						
With my family	29	36.7	45	52.9	5.495*	0.064
With my friends	41	51.9	36	42.4		
Alone at home	9	11.4	4	4.7		
Mother's education						
Elementary school & below	44	55.7	50	50.8	1.779*	0.619
Middle school	19	24.1	15	17.6		
High school	11	13.9	11	12.9		
University & above	5	6.3	9	10.6		
Father's education						
Elementary school & below	36	45.6	36	42.4	0.454*	0.929
Middle school	17	21.5	22	25.9		
High school	15	19.0	16	18.8		
University & above	11	13.9	11	12.9		
Family type						
Nuclear family	57	72.2	69	81.2	3.872**	0.144
Extended family	21	26.6	13	15.3		
Broken family	1	1.3	3	3.5		
High school education						
Vocational	6	7.6	8	9.4	1.294**	0.730
Anatolian	61	77.2	64	75.3		
Science	8	10.1	11	12.9		
Open education	4	5.1	2	2.4		

*Chi-Square; **Likelihood ratio; $p<0.05$; SD=Standard deviation.

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Table 2. Environmental characteristics.

Environmental characteristics	Experimental group (n=79)		Control group (n=85)		X^2	*p*
	Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)		
Question 1						
No	69	87.3	72	84.7	0.236*	0.627
Yes	10	12.7	13	15.3		
Question 2						
No	8	10.1	6	7.1	1.360**	0.507
Yes	70	88.6	76	89.4		
I don't know	1	1.3	3	3.5		
Question 3						
No	13	46.5	7	8.2	2.584*	0.108
Yes	66	83.5	78	91.8		
Question 4						
No	60	75.9	70	82.4	1.022*	0.312
Yes	19	24.1	15	17.6		
Question 5						
No	75	94.9	81	95.3	0.000**	1.000
Yes	4	5.1	4	4.7		
Question 6						
No	56	70.9	52	61.2	1.717*	0.190
Yes	23	29.1	33	38.8		

Question 1=Whether you have received education on environmental health; **Question 2**= Is environmental health education important?; **Question 3**= Concern about the environment you will leave to future generations; **Question 4**=Participation in environmental activities; **Question 5**= Membership in an environmental non-governmental organization; **Question 6**= Whether you pay attention to whether the products you buy are environmentally friendly.

Table 3. Comparison analysis.

Variables	Experimental group (n=79)			Control group (n=85)			
	Median	IQR	*p**	Median	IQR	*p**	*p***
Receiving							
Before	14.00	2.00	-2.487; 0.013	14.00	2.00	-0.037; 0.971	3223.500**; 0.653
After	15.00	2.00		14.00	2.00		2765.500**; 0.046
Reacting							
Before	31.00	4.00	-3.074*;0.002	30.00	5.00	-0.320;0.749	3256.000**;0.737
After	31.00	2.00		30.00	5.00		2524.000**;0.006
Valuation							
Before	6.00	1.00	-4.820*;0.000	6.00	1.00	-0.417;0.677	3231.500**;0.659
After	7.00	2.00		6.00	2.00		2056.500**;0.000
Organizing							
Before	15.00	4.00	-2.227*;0.026	15.00	6.00	-3.002;0.003	3020.500**;0.265
After	13.00	5.00		14.00	5.00		2940.000**;0.168
Personalizing							
Before	7.00	3.00	-3.926*;0.000	7.00	3.00	-2.991;0.003	3307.500**;0.867
After	8.00	2.00		8.00	3.00		3013.000**;0.248
Total Scale							
Before	73.00	10.00	-3.288*;0.001	72.00	12.00	-0.526;0.599	3312.500**;0.882
After	73.00	7.00		72.00	10.00		2863.000**;0.103

*Wilcoxon test; **Mann-Whitney U test; IQR=Interquartile Range; $p<0.05$.

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Developing robust environmental attitudes among those receiving university-level education is particularly important (Álvarez-Nieto et al., 2024). Specifically, advancing these attitudes in nursing students will be effective in raising crucial awareness about the direct impact of the environment on human health (Mohammed et al., 2024). The approach will increase societal consciousness and proactive attitude toward environmental protection along with positioning future nurses as essential advocates for both public and planetary well-being. The recent study highlighted that nurses' competency is measured by technical skill and ability to Receive (listen empathetically and observe non-judgmentally), React (respond promptly and advocate ethically), and demonstrate Valuation (show unwavering commitment to patient dignity and safety). In educational settings, nurse educators are the key agents responsible for designing and implementing training that moves students with reflective practice, ethical case discussions, and mentorship to help students Organize values into a consistent philosophy of care and Personalize them into their professional identity (Froneman et al., 2022). Therefore, the improved scores in the experimental group reflect a successful bridging of the gap between theoretical knowledge, compassionate, and ethical professional behavior which is the ultimate goal of nursing education. Several studies in Turkey supported the finding of this present study. For instance, a study found that though middle school students' environmental attitude scores were initially similar across groups, the Nature Camp-Supported Environmental Education improved the attitude scores of the experimental group compared to the control group (Özgel et al., 2018). Other research concluded that nature education programs have a positive effect on participants' environmental awareness, attitudes, and behaviors toward the environment (Keleş et al., 2010). The present study shown that educational and experiential learning initiatives strengthen individuals' environmental attitudes and awareness in the development of environmental attitudes and awareness aimed at protecting the environment. Educational interventions are effective in developing knowledge and attitudes about environmental issues among nursing students (Hägg-Martinell, 2025).

Our study's findings demonstrate a clear moderate to strong effect from the conducted training which in line with published literature above about environmental conscientiousness improvement. This validation strongly suggests that structured educational programs can successfully initiate cognitive and affective shifts related to environmental protection. Given the success, the immediate priority is to increase and diversify intervention efforts that focusing on building foundational environmental awareness and attitudes. This requires translating these internal shifts into observable responsibility and sustained pro-environmental behavior among nursing students. The strategies will be used for repeating the successful intervention model in different sample groups and diversifying the methods of delivery for adaptability across various level of nursing education. Despite the promising magnitude of the training's effect, a critical self-analysis reveals two significant methodological constraints. First, the lack of randomization in assigning students to the experimental and control groups represents a threat to the internal validity of the study. Without randomization, the possibility of inherent selection bias (pre-existing differences in motivation or interest between the groups) cannot be fully eliminated, meaning the observed effect might be partially attributed to baseline characteristics rather than solely to the training. Second, the four-week duration of the training program is inherently limited in its ability to sustain behavioral changes. Durable shifts in complex habits like sustainable consumption require reinforcement and practice over a much longer period than a single month. Hence, future research must address these limitations head-on by adopting more randomized controlled trial (RCT) designs and incorporating extended follow-up periods (e.g., six months to one year). This would allow researchers to definitively validate the causal effect of the training and confirm the critical persistence of environmentally conscious behavior over time. Consequently, a short-term educational success would be transformed into sustained commitment.

Conclusion

The finding that environmental training significantly improved the attitudes of nursing students is a powerful affirmation of the role of higher education in environmental stewardship. Nursing students as future healthcare professionals are on the front lines of public health issues, which are increasingly intertwined with environmental problems like pollution, climate change, and resource scarcity. Their positive shift in attitude demonstrates that educational interventions can be effective in converting theoretical knowledge into a value-based commitment to the environment. This successful model provides a strong justification for broader and more diversified efforts across the entire university community. To maximize the impact of environmental education and build a truly environmentally conscious generation of professionals, it is imperative that future studies heed two major recommendations such as utilizing different intervention programs and conducting studies across diverse academic departments. Including students from diverse academic departments as limiting environmental studies to related fields (like nursing or biology) misses a crucial opportunity to influence the decision-makers of tomorrow

in every sector. To ensure a truly sustainable future, environmental literacy must be integrated and mainstreamed across all faculties.

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AI statements
The conceptual framework and idea generation for this research were developed by the authors that grounded in a thorough literature review. Though no artificial intelligence was used in the design or execution of the study, AI support was applied only for enhancing the grammatical structure of certain sentences. This limited use of AI ensured clarity and linguistic accuracy without influencing the scientific integrity or originality of the research content.

Author's declaration
All authors contributed to the conceptualization and data collection of the study. The corresponding author was responsible for data analysis and tabulation. All authors reviewed and approved the final version of the manuscript.

Availability of data and materials
The research data sets are available from the corresponding author upon reasonable request.

Competing interests
The authors declare that they have no conflict of interest.

Ethical clearance
Ethical approval for this research was obtained from the ADU Social and Human Sciences Research Ethics Committee (Number: 31906847/050.04.04.-08).

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Publishers and journal's note
This study demonstrates that training aimed at enhancing nursing students' attitudes toward environmental issues was effective in improving those attitudes. It highlights the positive impact of educational interventions and the value of experimental research in addressing environmental awareness within nursing education. The findings underscore the importance of integrating environmental topics into the nursing curriculum. No ethical concerns were identified throughout the course of the study.

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Authors' insight

Key points

- The study investigates how structured environmental awareness training influences nursing students' attitudes toward sustainability, ecological responsibility, and environmental health practices.
- The study may emphasize how environmental awareness training shifts attitudes and improves long-term behavioral change among nursing students.
- The findings may highlight the importance of integrating environmental topics into nursing curricula and emphasize nurses' roles in promoting environmental health and sustainable healthcare practices.

Emerging nursing avenues

- How does environmental awareness training affect nursing students' willingness to incorporate sustainability into their future clinical practice?
- What specific components of the training were most effective in shifting students' attitudes toward environmental responsibility?
- How can nursing education programs systematically embed environmental health principles to prepare students for eco-conscious healthcare delivery?

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